

EFFECT OF PAPAYA LEAF JUICE ON HEMATOLOGICAL PARAMETERS OF RATS

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ABSTRACT

Papaya leaf juice has been traditionally used for symptomatic relief of dengue fever. The objective of this study was to evaluate the efficacy and toxicity of Papaya leaf juice. Wistar rats of either sex was used and treated for seven days with 0.25ml/kg (dose equivalent to traditional human usage) with freshly prepared Papaya juice followed by the measurement of liver function test and total blood count. The result of our study showed significant increase ($p < 0.005$ and $p < 0.01$ respectively) in the level of platelet count and total bilirubin levels when compared with the control group. Whereas, significant decrease in the level of RBC count were also observed in the treated group of animals. It is concluded from the results that at traditional doses Papaya leaf extract significantly increase the platelet count in rats. However, its use in anemic patient should be monitored and regulated by the health care professionals to avoid any major problem in the patients.

Keywords: Papaya leaf juice; Platelets; hemolysis.

INTRODUCTION Dengue virus is transmitted and cause dengue fever through the bite of mosquito named *aedes aegypti* [1] that may cause life threatening blood disorder due to decrease in the platelet count [2]. According to the data revealed by world health organization, 50–100 million humans infected from Dengue virus each year in developing countries [3]. Traditionally, Papaya Leaf juice (around 10 ml twice a day for adults) has been used for the treatment of thrombocytopenia in dengue fever [4]. Many research studies showed that Papaya leaf extract have potential to increase the level of platelet count significantly [5, 6]. Study conducted by Sathasivam et al in 2009 revealed that at a dose of (15 mg/kg) powdered papaya leaf suspension increases the platelet counts in

mice [7]. However, limited preclinical reports addressing its efficacy & toxicity of the raw juice (the one traditionally used) in rodents. The current study is aimed at exploring the platelets count enhancing ability and safety of papaya leaf juice in rodents.

MATERIAL AND METHODS

Animals: Healthy Wistar rats (200 – 300 g) of either sex were procured from commercial facility and kept under standard environmental conditions i.e. (25-30°C) temperature with 12h light/12h darkness and 66% relative humidity. Standard diet and water *ad-libitum* were provided to the animals. The animal's handling was according to the condition mentioned in the Guidelines of National Institute of Health (NIH publication no. 85-23, revised 1985)

Table-1. Effect of papaya leaf juice on blood cells count of rats

Sex	Groups	RBC (million/ μl)	WBC (10 ⁹ /L)	PLATELET COUNT(10 ⁹ /L)
Male	Extract	7.5 ± 0.1**	9.7 ± 0.6	1400 ± 82***
	Control	8.0 ± 0.1	10 ± 0.9	990 ± 53
Female	Extract	8.1 ± 0.1*	6.0 ± 0.4	1192 ± 36**
	Control	8.4 ± 0.1	7.0 ± 0.7	1026 ± 50

* (p<0.05), ** (p<0.01) and *** (p<0.005) as compared to the control.

Table-2. Effect of papaya leaf juice on the LFT profile of rats

Sex	Groups	TOTAL BILIRUBIN (mg/ dl)	SGPT (U/L)	ALKALINE PHOSPHATASE (U/L)
Male	Extract	0.27 ± 0.008***	70 ± 1.7	362 ± 16
	Control	0.08 ± 0.005	71 ± 3.4	330 ± 23
Female	Extract	0.37 ± 0.01***	57 ± 2.6	332 ± 25*
	Control	0.05 ± 0.006	53 ± 3.3	283 ± 12

* (p<0.05), ** (p<0.01) and *** (p<0.005) as compared to the control.

for the care and use of laboratory animals with approval (ERB-402-2020) Preparation of Papaya leaf juice and administration. The fresh papaya leaves were collected (Herbarium specimen voucher No. 20051, Department of Botany, University of Karachi), washed, dried and crushed to obtain the juice. After filtration, the juice was orally administered (0.25 ml/kg; based on adult human usage i.e. 10 ml twice a day) for seven days followed by hematology and liver function test. Blood cells count and Liver function test for the assessment of liver enzymes and blood cell count, blood was withdrawn from the control and treated animals in the EDTA vacutainers & taken to diagnostic facility of Dr. Panjwani Center for Molecular Medicine & Drug Research (PCMD) for complete blood count (CBC) and liver function test (LFT).

STATISTICAL ANALYSIS

Differences between various means were evaluated by one way ANOVA. Asterisks represent the significant difference as follows: * ($p < 0.05$), ** ($p < 0.01$) and *** ($p < 0.005$).

RESULTS AND DISCUSSION

The aim of this study was to determine the efficacy and toxicity of papaya leaf juice in both male and female Wistar rats. Whereas, significantly increase in the platelet count was observed in male and female rats when compared to the control group of animals (Table-1) which supports the traditional use of papaya leaf juice for symptomatic treatment of dengue fever [8].

The presence of phenolic compounds [9], saponins, cardiac glycoside alkaloids [10], vitamins and minerals

has been revealed by phytochemical analysis of Papaya juice and needs to be individually assessed for the above results. However, significant decrease in the number of RBCs were observed in our study contemporary with the increase in the total bilirubin level as shown in the (table-2) which may be due to the hemolysis potential of the juice. *In vitro* study conducted by Ranasinghe et al in 2012 on Papaya juice showed that the extract interacts with the erythrocyte membrane [11] which strongly supports our data. One of the Previous studies shows that at low doses the extract stabilized the membrane that is suggestive of predominating U-shape response in toxicology [12] thereby supporting our results. To the best of our knowledge, this is the first report (*in vivo*) exhibiting the hemolysis causing potential of papaya leaf juice in rodents. However, the effect needs to be confirmed in clinics in order to protect the vulnerable subjects (anemic or those predisposed to anemia such as deficient in glucose-6-phosphate dehydrogenase enzyme) from the toxic effect of the juice.

CONCLUSION

The hemolysis inducing potential of papaya leaf juice strains the need of preventing it's over the counter use as symptomatic treatment of dengue fever. However, its efficacy in dengue fever is evident in our observation. Therefore, we strongly suggest caution for its use.

CONFLICT OF INTERESTS

The author declares no conflict of interest

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